

ATOMIC ENERGY

THE FIRST AND ONLY ATOMIC ENERGY NEWSLETTER

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Dear Sir:

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Expenditures for all phases of the atomic energy program were estimated at \$1,775,000,000.00 for the 1953 fiscal year, which begins next July 1st, in the Budget submitted to Congress last week by President Truman. Of the total expenditures, about \$1,000,000,000.00 is earmarked for plant and equipment in the fiscal year 1953. However, over a period of about 5 years, a \$5 billion to \$6 billion expansion of atomic energy facilities will be promulgated, the President stated. While the proposal will be submitted to Congress during the present session, actual construction is not expected to get under way to any substantial degree until the latter part of 1953, he said. Since no major cash expenditures will be made under this expansion until after the fiscal year 1953, the expenditure for the 1952 and 1953 fiscal years will not be materially affected, the President observed. (Revised estimates for expenditures in 1952 now show an increase to \$1,725,000,000.00; this compares with the actual 1951 figures of \$897,000,000.00 and the larger 1953 figure, to show the continuing upward spiral of atomic expansion underway even without the new and drastic increases.)

In asking Congress for the USAEC's funds, President Truman noted that the major program initiated in October, 1950, for expanding the productive capacity of the U. S.'s atomic energy plants is well under way, and these plants will begin to contribute to fissionable material output in the fiscal year 1953. Funds recommended for the USAEC include increased amounts for the procurement of uranium ores and concentrates, the production of fissionable materials, and atomic weapons, and the development of improved and more effective weapons. Increases were also provided for an expanded effort to develop improved nuclear reactors for the production of fissionable material as well as reactors, for the propulsion of submarines and aircraft.

Eugene M. Zuckert, former assistant Secretary of the Air Force, has now been nominated to be a member of the USAEC. Mr. Zuckert will fill the unexpired term of Commissioner Sumner T. Pike, who has resigned.

A new approach will now be made toward further exchange of atomic information by the United States and Britain. In this new attempt, a small working party of scientists from both countries will study the specific areas of atomic energy in which the British want to exchange information. In the event the Americans find that such an exchange will be to the benefit of the United States, then further negotiations will take place, since the Atomic Energy Act of 1946 requires that any exchange be "substantially beneficial" to the United States. Meanwhile, a series of meetings has taken place in Washington between Gordon Dean, USAEC Chairman, and Lord Cherwell, Prime Minister Churchill's principal advisor on atomic energy, during which many of the important facets of this information exchange have been discussed.

Construction of the hydrogen bomb materials plant--the Savannah River Plant in South Carolina--has advanced to the point where approximately 25,000 persons are engaged in construction activity at the project. It is expected that peak employment of these construction workers will reach 45,500 in September of this year.

INDUSTRIAL NEWS...in the nuclear energy field...

NUCLEAR REACTOR MATERIALS- An expanded program of research and development in the field of nuclear reactor materials will be carried out by Sylvania Electric Products, Inc., under a new contract recently negotiated between that company and the USAEC. The new contract supplements the current USAEC work at Sylvania's metallurgical laboratories which has been in progress since 1948. In general, the expanded program will cover research and development on the physical properties, metallurgy, and behavior of materials used in nuclear reactors. The USAEC work will be consolidated by Sylvania in its atomic energy division, according to E. Finley Carter, Sylvania vice-president in charge of engineering. To house the administration and staff of the new division, Sylvania is building a 50,000-sq.-foot laboratory at its 56 acre research site at Bayside, where its nuclear research is currently being conducted, by approximately 200 persons. The new contract is expected to increase the staff to approximately 500 persons.

URANIUM FEED MATERIALS- The Catalytic Construction Co., Philadelphia, Pa., under a recently awarded USAEC contract, is to conduct an intensive survey of the USAEC's uranium feed materials production processes. The initial phase of the survey (which the contract specifies must be completed within 6-months) will consist of an economic and engineering study of all uranium feed materials processes, both under construction and in operation, as well as an investigation of related research and development work throughout the USAEC and a review of all published data on uranium technology. Directing the survey will be Whitney Weinrich, chief process engineer for Catalytic at the USAEC's Feed Materials Production Center now under construction near Cincinnati, Ohio. (The design and engineering contract for the new Center, originally awarded to Catalytic in November 1950, has been expanded to include process development and design and procurement for two additional production units there.)

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear field...

The Measurement of Radio Isotopes, by Denis Taylor, Head, Electronics Div., Atomic Energy Research Establishment, Harwell (England). Background knowledge concerning radioisotopes.--Methuen, London, W.C.2. (6s 6d.)

Physical Properties and Analysis of Heavy Water. One of the National Nuclear Energy Series, Manhattan Project Technical Section. Div. 3, v. 4A. Isidor Kirshenbaum. Edited by Harold Urey and George M. Murphy. 453 pages.--McGraw-Hill Book Co., New York 18, N.Y. (\$5.25)

Control and Removal of Radioactive Contamination in Laboratories. Contains recommendations for safe handling and utilization of radioactive isotopes. The handbook discusses permissible levels of contamination as well as decontamination procedures for the skin, clothing, and bedding, laboratory tools and glassware, floors, work benches, hoods, etc. It also outlines emergency procedures. Prepared by National Bureau of Standards.--Superintendent of Documents, Washington 25, D.C. (15¢)

Supplement 2, Nuclear Data. A collection of experimental values of half-lives, radiation energies, relative isotopic abundances, nuclear moments, and cross sections, compiled at the National Bureau of Standards. 63 p., \$4.25 for this particular supplement plus three other supplements:--Includes nuclear data reported during the July 1950 to January 1951 period. In addition, it contains a new class of information not in supplement 1: a year's list of fission and spallation papers. --Superintendent of Documents, Washington 25, D.C.

Explosive Characteristics of Titanium, Zirconium, Thorium, Uranium and their Hydrides: Report of Investigations #4385. Suggested measures for curbing explosion hazards while handling or processing powders of these metals, and their hydrides, as developed by the U. S. Bureau of Mines.--Publication Section, Bur. of Mines, 4800 Forbes St., Pittsburgh 13, Pa. (n/c)

Research on Crystal Detectors of Ionizing Radiation. Comprises three reports: (1) New materials for scintillation counters, (2) Studies and applications of scintillation counters, and (3) Advances in the detection of gamma rays. Work was done at Princeton University, Physics Dep't., Feb-Aug. 31, 1950. Available from Photoduplication Service, Library of Congress, Washington, D. C.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...in the nuclear field...

FROM THE MANUFACTURERS- Libby carbon-14 age determination apparatus, enables the age of any historical artifact, between 1000 and 25000 years old, composed of organic material, to be determined. The machine consists of a ring of 11 matched anti-coincidence counters, the latest design Libby screen wall counter, an electronic circuit containing separate voltage supplies for each set of counters, a scale of two circuit and a Veeder-Root recorder, together with an anti-coincidence circuit. Special techniques have been developed to assure low background, it is said. In its present design the apparatus incorporates the best features and refinements of approximately three different types of age determination machines constructed previously by this manufacturer, who has worked with this type of instrument for five years.--Radiation Counter Laboratories, Inc., Skokie, Illinois.

Sets of five beta-emitting calibrated reference sources. Comprise sources of carbon-14; cobalt-60; thallium-204; bismuth-210; and protactinium-234. The beta energies range from 0.155 Mev to 2.3 Mev. The set provides a convenient method for determining the beta efficiency of radiation detection units such as Geiger tubes, scintillation phosphors, electroscopes, etc., over a wide energy range. Additional mounts and copper discs are provided for millicurie determinations of numerous beta emitting radioisotopes.--Atomic Instrument Co., Cambridge 39, Mass.

New particle accelerator of Cockcroft- Walton type operates at voltages up to 250 kilovolts and delivers focused beam of charged particles concentrated in a circle smaller than 1 mm. diameter. Beams of larger area may be obtained. R-f. ion source operates with hydrogen, deuterium, helium, argon and xenon. Accelerating system is horizontal, 10-feet long, and is mounted on wheeled carriage. Requires no special building facilities, and may be operated in a room 12-feet wide by 18-feet long.--American Instrument Co., Inc., Silver Spring, Md.

NOTES-A gown of lead glass fabric, designed for protection against X-ray radiation and beta radiation, has been found to be effective for this purpose, according to Drs. V. W. Archer, G. Cooper, Jr., J. G. Kroll, and D. A. Cunningham, of the department of roentgenology of the University of Virginia hospital, Charlottesville, Va. The advantages of the gown over existing protective devices, the doctors reported, include its complete protection of all exposed parts of the body, flexibility, durability, a weight of only 10½ pounds which is evenly distributed over the body, and cleanliness, since the garment may be washed with soap and water.

By bonding lead and copper, in a manner which retains the best features of both metals, Knapp Mills, Inc., has produced a new material which it calls Cupralum. Suggested uses for Cupralum include shielding against ionizing radiation.

A symposium on scintillation counters, which includes papers on photomultipliers, liquid and crystal phosphors, and associated apparatus, is being held in Washington at the National Bureau of Standards today and tomorrow. (Jan. 29-30). It is under the joint sponsorship of the American Institute of Electrical Engineers, Institute of Radio Engineers, the USAEC, and the NBS.

The Los Angeles Tumor Institute, Los Angeles, is obtaining from the USAEC's isotopes division at Oak Ridge 1000 curies of cobalt-60 for therapy in certain types of cancer. It is the largest radioactive source ever produced in the United States for treatment of cancer in humans. Prepared at the Oak Ridge reactor, the cobalt-60 was bought for less than \$10,000. (It is of interest that 1000 curies has an initial energy equivalent approximately to that of an amount of radium worth \$25 million at the current price level.) The metal cobalt-60 is in the form of six rods, each 3.2 cm long and 1 cm. diameter. Another cobalt-60 source, of about 340 curies, is destined for the Chicago Tumor Institute. It is now being tested at Oak Ridge, following its preparation there.

The Cambridge Absolute Air Filter, originally developed for the USAEC, and now available in quantity for commercial and industrial use, is described in a new specification sheet just issued by the maker, the Cambridge Corp., Syracuse, N.Y. The filter, developed by Arthur D. Little, Inc. (Cambridge, Mass.) and Carrier Corp. (Syracuse, N.Y.), provides virtually absolute removal of all measureable dust, smoke, fumes, spores, radioactive particles and other microscopic foreign matter from the air.

RADIOISOTOPES & IONIZING RADIATION...investigations & notes...

INVESTIGATIONS- Experiments have been conducted on the influence of alcohol on the lethal effects of whole body irradiation in mice, at Christie Hospital and Holt Radium Institute, Manchester (England) by Edith Paterson and Joyce J. Matthews. Various concentrations of alcohol were used, given intravenously. It was found that the administration of the alcohol prior to radiation increased the dose required to kill 50% of the mice, and extended the life of the non-survivors. However, no protection was obtained when a 10% alcohol solution was given after radiation in two doses, 1 ml. immediately after radiation followed by 0.5 ml. one hour thereafter. Comparison of the protective effects of equal volumes of 10% or 4% alcohol showed that both concentrations were protective, but that the difference in protection value between them was not significant.

The protective action of methylamine against X-irradiation has been investigated by Z.M. Bacq and A. Herve, University of Liege (Belgium). In the work, a first control group of mice received a single lethal dose of X-rays. A second group was injected intraperitoneally with methylamine (2 mgm.) neutralized in water solution. A third group was irradiated just as the controls immediately after an intraperitoneal injection of 2 mgm. methylamine. The mice injected with methylamine and irradiated with 850 r died between the fourth and eleventh day later generally than the controls; only 7% survived. An injection of 2 mgm. or 2.5 mgm. of methylamine did not protect any animal against a dose of X-rays greater than 850 r. The experimenters conclude that the action of methylamine is one of pure protection; the substance must be present in the body during irradiation; it becomes ineffective if given after irradiation.

NOTES- A course in Radiologic Physics will be given at Columbia University during the coming Spring session by Dr. Edith Quimby, associate professor of radiology, and Carl Braestrup, associate in radiology. The course is especially designed to meet the needs of non-medical personnel in industry and research who are using radiation in their every-day work. Topics to be covered include radiation measurement; dosage problems in the use of X-ray and radium; protection against radiation; radiobiology; and the use of radioisotopes.

With the completion of its radioactivity center as the first unit of the University of California's new \$21 million medical center at San Francisco, the western part of the United States now has a valuable repository for radioisotopes, with facilities duplicated only at Argonne National Laboratory and Oak Ridge. The new laboratory will serve as a processing and storage center for radioactive materials from the USAEC's nuclear reactors at Oak Ridge, and will also offer individual investigators space, specialized equipment, and the advice of experts for the solution of research problems.

The use of radioisotopes for tagging the constituents of hard water, to identify hardening elements in wash water and find out how much remains on fabrics after washing, was suggested by Dr. P. C. Aebersold, USAEC, Oak Ridge, in a talk before 1,000 executives of the Association of American Soap and Glycerine Producers Inc., meeting in New York last week. Dr. Aebersold pointed out that radioisotopes can also be used to label various kinds of soil that must be removed from fabrics by laundering. The broad use of radioisotopes for tagging soaps will be a means of improving textiles, he observed.

Members of the National Cannery Association, meeting in Atlantic City last week, were urged to commercially exploit radioactive fission products in cold sterilization of food products. J. H. Hayner, USAEC, Washington, told the Association members that the gross fission products (now waste from nuclear reactor operations) will become available in millions of curies. Hayner emphasized that the largest single potential demand for a confined radiation source is in this field of cold sterilization, especially in processing such foods as canned ham, peas, etc.

A new course entitled "Radioisotopes--A new Aid to High School Teachers" will be given to high school science teachers in the City of New York Feb. 27-June 11. Objectives are to enable science teachers to demonstrate to their own classes certain of the fundamental of nuclear science.

ATOMIC PATENT DIGEST...latest U. S. grants & applications...

GRANTS- Locating casing collars in a well. Comprises passing a source of neutrons through the cased bore hole whereby the casing, casing couplings, and surrounding formations are subjected to neutron bombardment, producing electrical pulses by the neutrons scattered within the surrounding material and returned to the bore hole near the source, and using the points of least scattered neutron intensity to indicate the position of the casing couplings in the hole. U. S. Pat. No. 2,580,544 issued Jan. 1, 1952; assigned to The Texas Co., New York, N.Y.

Processes of producing uranium chlorides. A process of producing the higher chlorides of uranium, comprising passing a stream of air in admixture with carbon tetrachloride vapor in which the volumetric ratio of air to carbon tetrachloride is about 1.3 to 3.2 and flowing at a linear velocity of about 1.7 to 5.1 cm. per second over a uranium oxide maintained at a temperature of 540 to 560 deg. C. to react therewith yielding vapor of higher uranium chlorides in admixture with effluent gaseous reaction products, and recovering uranium chlorides from these effluent gaseous reaction products. U.S. Pat. No. 2,582,941, issued Jan. 15, 1952; assigned to United States of America (USAEC).

Isotope separation. In an electrical discharge device, means for producing a uniform direct-current magnetic field, means for producing an alternating divergent electrical field substantially at right angles thereto, means to furnish ions to the space occupied by said fields, and a collector electrode adapted to receive said ions moving through this field. U. S. Pat. No. 2,581,813 issued January 8, 1952; assigned to Westinghouse Electric Corp., E. Pittsburgh, Pa.

Insulation. An electrical apparatus having a slotted magnetizable core, and a winding having two straight coil-size portions lying side by side in each slot with flat sides adjacent to each other, each coil-side portion having an adherent butt-jointed layer of non-ferrous asbestos paper wound circumferentially around the coil-side portion and impregnated with a thermosetting resin consisting essentially of a copolymer of propylene glycolmaleate and styrene. U. S. Pat. No. 2,581,862 issued Jan. 8, 1952; assigned to United States of America (USAEC).

Process for electrodepositing uranium dioxide. The process for electrodepositing uranium dioxide which comprises contacting two inert electrodes with a dilute aqueous solution wherein the solute consists essentially of uranyl nitrate and at least one material from the class consisting of potassium carbonate and potassium hydroxide, the amounts of these materials being such that the concentration of the negative ions of these materials is from about 200 times to 3000 times the concentration of the uranyl ion, and passing a direct current through this solution at a current density of between 0.6 to 1.5 amperes per square decimeter for a period of from about 90 to 160 minutes. U. S. Pat. No. 2,581,863 issued Jan. 8, 1952; assigned to United States of America (USAEC).

Neutron-absorbing borate glass, containing by weight as essential ingredient: cadmium oxide, 45 to 69 per cent; indium oxide, 2 to 21 per cent; boron oxide, 28 to 42 per cent. These three oxides total at least 75 per cent by weight. U. S. Pat. No. 2,582,081 issued Jan. 8, 1951; assigned to Eastman Kodak Co., Rochester, N.Y.

Electrometer for pocket chambers. A charging socket for a pocket ionization chamber of the type including an outer cylindrical electrode and an inner coaxial rod electrode, this socket comprising a cylindrical socket element adapted to electrically contact the outer cylindrical electrode of this chamber when it is inserted into it. U. S. Pat. No. 2,582,163 issued Jan. 8, 1952; assigned to United States of America (USAEC).

APPLICATION- Radiation measuring apparatus. An electronic circuit of high sensitivity for measuring small currents such as those produced by ionization chambers for the detection of radioactivity. Pat. Application No. 622,635 filed Oct. 16, 1945. Assigned to United States of America (USAEC).

Sincerely,

The Staff,
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